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AUTHOR Kagan, Jerome; And Others
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ABSTRACT

This is a partial report of a longitudinal investigation designed to assess the psychological effects of an experimentally conducted day care program on children during the first 30 months of life. The experimental subjects were Chinese and Caucasian children from working and middle class families who were cared for at a special group care center five days a week from 3 1/2 to 30 months of age. The major control group consisted of children reared totally at home but matched with the experimental children on ethnicity, social class and sex. The children were assessed at 3 1/2, 5 1/2, 7 1/2, 9 1/2, 11 1/2, 13 1/2, 20 and 29 months, although this paper deals only with some of the data gathered during the assessments at 20 and 29 months. The three assessments during the second year evaluated patterns of play with objects, social behavior with peers, attachment behavior to the mother and surrogate caretaker, as well as cognitive competences. The data revealed little difference between the day care and home control children with respect to cognitive functioning, language, attachment, separation protest, and tempo of play. The only simple effect of form of rearing involved behavior with unfamiliar peers. The day care children were less vigilant and less inhibited in the presence of unfamiliar children than were those reared at home. It was concluded that the home environment influenced children's early development more than experiences in the day care context. (Author/BRT)

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THE EFFECTS OF INFANT DAY CARE ON PSYCHOLOGICAL DEVELOPMENT

By

Jerome Kagan, Ph.D.
Harvard University

Richard B. Kearsley, M.D., Ph.D.
Philip R. Zelazo, Ph.D.
Tufts University Medical School

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Summary

This is a report of a longitudinal investigation designed to assess the psychological effects of an experimentally conducted day care program on children during the first 30 months of life. The experimental subjects were Chinese and Caucasian children from working and middle class families who were cared for at a special group care center five days a week from 3 1/2 to 30 months of age. The major control group consisted of children reared totally at home but matched with the experimental children on ethnicity, social class and sex.

The children were assessed at 3 1/2, 5 1/2, 7 1/2, 9 1/2, 11 1/2, 13 1/2, 20 and 29 months. The assessments during the first year focused on attentiveness to visual and auditory events, reaction to discrepancy, and separation protest. The three assessments during the second year evaluated patterns of play with objects, social behavior with peers, attachment behavior to the mother and surrogate caretaker, as well as cognitive competences. The latter set included performance on tests of memory, linguistic knowledge, perceptual analysis, reaction to discrepancy, and selected items from the Bayley Developmental Scale. This paper deals only with some of the data gathered during the last two assessments at 20 and 29 months.

The data revealed little difference between the day care and home control children with respect to cognitive functioning, language, attachment, separation protest, and tempo of play. The only simple effect of form of rearing involved behavior with unfamiliar peers.

The day care children were less vigilant and less inhibited in the presence of unfamiliar children than were those reared at home. However, it is important to emphasize that the sample of children came from predominantly intact families, few experienced extreme forms of psychological deprivation at home, and the day care experience was closely monitored by the principal investigators and implemented by mature, conscientious and nurturant caretakers.

There was a provocative interaction among ethnicity, class and rearing. Among working class Chinese children the day care experience facilitated cognitive development and reduced apprehension in unfamiliar situations; this effect did not occur among Caucasians.

In general, the home environment seemed to be more influential in sculpting each child's early development than experiences in the day care context.

The question that provoked the work to be summarized can be put in deceptively simple form. Do infants attending a well-run, nurturant, responsible group care center five days a week for a little over 100 weeks display different patterns of psychological development during or at the end of that period compared with children of the same sex and family background who are being reared in a typical nuclear family context in the northeastern United States?

Why would two child psychologists and a pediatrician initiate such an investigation and why would federal and private funding agencies be willing to allocate a considerable amount of money to obtain information on this issue? An answer to that question requires an examination of some of the unstated premises--absolute presuppositions in Collingwood's terms--that provoked the work.

The determining role of environment

Unquestionably the fundamental premise behind the research was that experience exerts a primary force on the young child's development and the earlier the experience the more profound the effect. The basis for this assumption lies everywhere, in our history as well as our contemporary literature. Two hundred years ago post-Revolutionary journalists regularly affirmed the critical importance of the early years. They urged mothers to stay home with their infants and young children and to treat them tenderly, while political leaders worked for the establishment of public

schools to insure that the young child was exposed as early as possible to consistently responsible models who would guarantee the proper development of the child's character.

There are at least four relatively independent bases for the supposition that variation in early encounters contributes to variation in later childhood. One of the first is John Locke's metaphor of the tabula rasa and the desire of so many seventeenth century intellectuals to make experience primary in the shaping of man's mind.

On the surface, Locke's catching metaphor was used as a weapon against Spinoza, Leibniz and the continental rationalists who preferred to award the mind innate ideas that were not the product of encounter with life. Although the debate between Locke and the continental rationalists seemed to be a philosophical disagreement over the likelihood of innate ideas and the differential beauty of mathematical versus empirical truths, there was a hidden agenda, as there are in most intellectual controversies. In this case two more profound issues fueled the debate. One was the continuing attempt by the liberal intellectual class to weaken the secular power and dogmatism of organized European Christianity. An attack on innate ideas was equivalent to an attack on organized religion--a little like the "People's Daily" attacking Chou En Lai by criticizing Confucius. In addition to the desire to weaken the Church's powerful hold on the citizenry, there was a deep belief in egalitarianism. The Church held as a basic tenet that some were born superior to others because

they were born in wedlock to Christian parents. Hence from the beginning, their minds were stocked with superior ideas and sentiments and nothing the nonChristian could do would make it possible for him to attain spiritual equality. To Locke and those like him who believed in political egalitarianism the doctrine of innate ideas was an intellectual obstacle to the attainment of political equality. The only way to insure that society would attain this ideal among all of its citizens was to hold an epistemology that made all infants equally skilled or unskilled at birth and to place experience in the role of unbiased tutor to all. Under these conditions the society could, if it wanted, arrange for the experiences of all of its children to be equivalent and by that action guarantee that their minds would be equally pure and alert. For Locke believed that men were by nature, "all free, equal and independent," a statement that reflects the close relation between Locke's politics and his epistemology. Citizens who preferred an egalitarian society would be attracted to a psychological theory that insisted that experience was the primary determinant of psychological differences among humans.

The influence of the Protestant ethic

A second historical force that promoted the primacy of early experience comes, oddly enough, from the Church in the form of a maxim that one must prepare for the future. Good deeds are tallied and influence one's state of virtue. As with the Hindu view of karma, they constitute a kind of totoboard that summarizes

each person's present moral posture. If a person's next life was determined by the virtue displayed in the present then the future--to some degree--is knowable. Western Protestantism announces that the child can attain salvation by virtuous behavior and parents are responsible for providing the socialization that makes virtue possible. The hope that the future might be made more certain by guaranteeing that the present was managed properly became a scientific creed for parents and social scientists. Colonial America's intellectuals, influenced strongly by Protestants with an egalitarian ideal, repeatedly urged mothers to care for their young children, implying that such care was not unlike gathering wood in August to prepare for December's wintry winds.

"Youth is the time to form both the head and the heart. The understanding is indeed ever enlarging but the seeds of knowledge should be planted in the mind while it is young and susceptible and if the mind is not kept untainted in youth, there is little probability that the moral character of the man will be unblemished.

"....it is more difficult to eradicate bad habits than it is to impress new ideas.

"The only predictable method to reform mankind is to begin with children....The great art of correcting mankind therefore consists of prepossessing the mind with good principles." (Noah Webster, in Rudolph, 1965, pp. 41-77.)

The physiological bases of psychology

The remarkable discoveries of the neurosciences of the last decade have reinforced an old view that it is potentially possible to translate psychological experience into sentences with purely physiological content. This attitude has extraordinary consequences for one's theory regarding the sequellae of experience. Although an introspective view of psychological experience is characterized by transience and change, (I am hungry now but was not moments ago) popular descriptions of the brain are less dynamic. Many of the connections between receptor cells, ganglia, and cortical areas are presumably fixed at birth. If we add the recent discoveries suggesting that experience affects the weight of the brain and early stimulation can add dendritic spines to cells or alter the sensitivity of the visual cortex to vertical or horizontal lines, one is tempted to view the central nervous system as a version of Locke's tablet--a surface that accepts material marks that are difficult to erase.

It seems that we have lived with a paradox, a psychological characterization of human functioning that is marked by reversibility but a neurophysiological view that implies irreversibility. Since certainty is the primary criterion the West uses in evaluating knowledge, the neurobiological view of experience, which is materialistic, is more attractive. Hence most citizens are friendly to the notion that experience is translated into material changes in the neurons--like marks on a tablet--that are fixed rather than transient. Marks on blackboards do not change spontaneously.

This view of the relation of brain to psychological experience evokes the metaphor of a tape and a tape recorder. The iron filings on the tape are permanently altered by a sonata and if no one erases the tape it will preserve that melody with fidelity for an indefinite period of time.

Our rank order society

A fourth reason for maintaining the strong belief in the sustaining power of early experience is a logical derivative of entrenched social practices in our society, particularly the tendency to rank children on valued traits both in and out of school. This practice sensitizes every parent of a preschool child to the fact that inevitably rankings will be made at the end of the kindergarten year. Those ranks will influence the quality of the education the child will receive through elementary and high school, the probability of gaining entrance into a good college and, it is assumed, the child's future vocational success and happiness, wealth, and dignity.

Most parents either know this sequence or sense it. As a result, from the perspective of parent and child, the goal is to be ahead early in the race. The goal is to be as high in the rank order as possible when the race begins, usually by 5 or 6 years of age. Most people believe, validly we think, that a 6 year old who is relatively high in the rank order on academic skills, IQ, or control of asocial behavior is more likely to remain high than to plummet. Hence the child who gets off to a good start in the development of culturally valued attributes

is likely, other things equal, to remain ahead. Americans see a life span as a long race course with most runners of roughly equivalent ability, speed and endurance. But some start the sixty year race a few days before others. Once the late starters begin to run they make progress but they never catch those who started just a little earlier. That view, which is partially compatible with the facts, would lead parents who want their children to gain positions of status, challenge, dignity, and wealth to assume that the differences at age 5, which are so obvious, were the result of what happened before that time. Hence they want to guarantee that their children have the best possible set of early experiences.

These premises, some metaphysical and some rooted in social reality, contributed to the intellectual foundations of the work.

Previous research on form of care

Recent studies of the effect of the arrangements of rearing, other than the nuclear family, on the child's growth reveal that group care for young children does not seem to have much of an effect, either facilitating or debilitating, on the cognitive, social, or affective development of most children. The one exception to that statement seems to hold for children from poorly educated and less privileged families. If these children attend special well-run centers they tend to perform a little better on the standard tests of cognitive development during the first few years of life than if they had been raised totally at home. (See Beth-Doyle, in press: Caldwell, Wright, Honig & Tannenbaum,

1970; Kohen-Raz, 1968; Leiderman & Leiderman, 1974; Lippman & Grote, 1974; Raph, Thomas, Chess & Korn, 1968; Robinson & Robinson, 1971; Schwarz, Strickland & Krolick, 1974; Tizard, Cooperman, Joseph & Tizard, 1972; Winett, Fuchs, Moffatt & Nerviano, unpublished.)

In general, the presence of multiple caretakers and peers and their potential for providing different patterns of encounter during the early years do not appear to be of significant import for the cognitive and social criteria assessed in these studies. Either these criteria measures are too crude to detect real differences among the groups--a real possibility--, the wrong variables are being assessed or, indeed, there are minimal or even trivial differences between children who have experienced good group care and those reared at home.

The selection of criteria in the present study

Before we turn to the methods used in this study, the results of which do not contradict those of earlier investigations, the reader should be acutely conscious of the hidden premises behind the variables we chose to assess. In some cases, the variables chosen and the evaluation of the "better score" reflect middle class American values.

Students of human development find it almost impossible to avoid taking sides with respect to the criteria of adaptation, and the history of psychology is littered with their choices--sensory acuity, tapping speed, libido, low anxiety, formal operational thinking, grades in school, IQ, and income are just a few.

We can divide this list into two major classes--those that appear in all--or in almost all--humans as a result of experience in any normal environment and those that are culturally specific. The latter can be further subdivided into those that are orthogonal to local "adaptation" and those that either facilitate or obstruct it.

Adaptation in our society requires possession of a competence that is valued by a segment of the community, a capacity for autonomous decisions and finally the belief that one is not basically inferior in value; that is, one has the opportunity to attain status and dignity. If those criteria are adopted, it is easy for the child psychologist to choose milestones which will preview the likelihood that a particular child will attain those prizes in adulthood. In our society verbal competence, problem solving skill, burgeoning independence, sociability, and control of anxiety at age 10 seem to predict the adult criteria. We selected criteria in the light of these considerations. But given another society different criteria might have been chosen.

The informal theory that provided early 19th century New England parents with guides as to how to insure that their children would be well adapted insisted upon promoting obedience to the family, punishment of all signs of aggression and sexuality, and insulation from other children, especially children from less religious and less affluent homes. Such children, it was believed, could corrupt the child and lead him away from virtue. Indeed, Jacob Abbott--the Dr. Spock of his day--warned parents that if they did not keep their children

at home, away from peers, they would invite trouble. It is likely we would have created test situations in 1825 that assessed the child's ability to resist influence from peers, rather than his tendency to initiate contact with peers.

This relativism in choice of criteria is especially relevant to the current project because half of our sample was Chinese and some of our parents held traditional Chinese values. One of these values is that children should be quiet, not talkative. The battery we devised, responding to the value biases of middle class American society, assessed the infant's tendency to vocalize and the 2 1/2 year old's talkativeness and richness of vocabulary. Had we constructed the battery from the perspective of our working class Chinese sample we might have created an assessment situation in which a child sat opposite an adult, and hidden observers coded how long the child remained quiet before speaking. The longer that delay the more mature the child. Such a decision would puzzle most American psychologists and administrators of grant awarding agencies. Since "remaining quiet" is maladaptive in our society, we did not create such an assessment situation; but not because talkativeness is universally more mature or desirable, but only because this study occurred in this culture, and it was appropriate to accommodate to the community in which these children will have to function.

We are aware of the fact that some of the variables we chose to evaluate reflect local values and are not to be regarded as universal referents for growth. On the other hand, other dimensions,

attentiveness, reaction to discrepancy, ability to adopt a problem solving set are more likely to be universally adaptive and to display a growth pattern over the first three years that may be representative of children in all locales.

METHODS

Sample

The subjects in this study were Chinese and Caucasian children from both working and middle class homes living in the Boston area. The original design called for three groups of children. Group 1, the experimental group, attended our research administered day care center. Group 2, the home control group, consisted of infants from the same ethnic and social class groups who lived at home. Group 3 consisted of infants who attended other forms of group care outside the home, either a day care center or custodial care. But the sample size in this group was small and will not be discussed in detail.

Generally, we performed two related analyses of the effects of group care. One analysis was a matched pairs analysis in which pairs of children were matched on sex, ethnicity, and education of both parents, but one of the children attended our day care center from 3 1/2 or 5 1/2 through 30 months of age, while the control member of the pair was reared at home. A second analysis included all the children in the experimental day care and home control samples. This sample included children from the matched pairs analysis. This analysis allowed us to inquire about the effects of ethnicity, class and sex, as well as form of rearing. Maximal sample sizes for the matched pairs analysis was 32 pairs of children. At some ages the number was a little smaller but the minimal number was 23 pairs and occurred at 29 months. The maximal sample size of day care and home control children is 99 children.

When all the children are included--day care, home control and mixed groups--the sample size for the older ages is 115. Table 1 lists the size of the sample by care, ethnicity, class and sex.

The children in all groups were enrolled in the experiment when they were 3 1/2 to 5 1/2 months of age. The children in Group 1 were usually in residence at the day care center 5 days a week from 7:30 in the morning until about 4:00 in the afternoon. Each infant was assigned to a primary caretaker and in most cases the caretaker was of the same ethnicity as the child. A manual of procedures for interaction with the infant and toddler formed the basis for play between caretaker and infant. These proscribed interactions were administered when the infant was alert, biologically satisfied, and not playing alone happily. Typically, an infant experienced between one and two hours of this interaction each day.

The curriculum had a middle class American bias--it encouraged cognitive development, one-to-one affective interactions between adult caretaker and child, and tried to maximize the opportunity that each child would have many successful mastery experiences.

The low child to adult ratio, together with the caretaker's assumption that she was, in part, an educator, made this an unusual day care setting and not representative of typical infant day care in the United States.

The assessments

Each child was assessed by a research staff who were not involved in any aspect of caretaking. Moreover, the offices of the research staff were in William James Hall in Cambridge, several miles from the day care center. Infants were assessed at 3 1/2, 5 1/2, 7 1/2, 9 1/2, 11 1/2, 13 1/2, 20 and 29 months of age. The assessments from 3 1/2 to 13 1/2 months occurred in a special laboratory at the day care center separate from the area where care was administered. The assessments at 20 and 29 months occurred in William James Hall.

We shall only be concerned in this report with some of the data gathered at 20 and 29 months and, therefore, shall only report the procedures for those relevant episodes.

Battery at 20 months

Episode	Variables Coded
Session I.	
Attachment: Child is observed for 45 minutes in a room containing his mother, an unfamiliar woman, and primary caretaker from day care center (if he is day care subject) or a familiar friend of family for home control child.	Duration proximity to each of the three adults Duration touching each of three adults Duration looking each of three adults Number of times child brings toy to each of three adults Number of times child smiles at each of three adults Duration vocalizing Duration fretting or crying
Vocabulary recognition: Child is shown sets of pictures of objects and asked to point to the object that the examiner names. The sets are: 1. fork spoon knife 2. banana apple orange 3. chair sofa table 4. carrot lettuce tomato 5. shirt skirt pants 6. horse chicken cow	Number correctly recognized

7. scissors pot shoes
8. tree cup flower
9. girl standing girl sitting policeman standing
10. toothbrush row boat duck
11. sink refrigerator stove
12. hat comb watch
13. moon necklace star
14. clock baby bottle bookcase
15. pig dog cat

Note: Item underlined is one requested by examiner.

Session II.

1. Solo free play: Child is in room with his mother and a set of age appropriate toys for 21 minutes

2. Peer play: An unfamiliar peer of the same age and sex as the child and the strange peer's mother enter the room and a new set of toys is brought in. The child's behavior is observed for an additional 21 minutes

Variables Coded

Duration of attentional involvement with each toy
Duration of time child relates 2 or more toys
Duration looking at mother
Duration proximal to mother
Duration each smile
Duration of vocalization
Duration of fretting or crying
Duration of involvement with each toy
Duration of time relates 2 or more toys
Number of times child initiates aggressive play with peer
Number of times child initiates cooperative play with peer

	Number of times child stays when he is approached by same peer
	Number of times child withdraws when he is approached by strange peer
	Number of times child resists coercion or aggression by strange peer
	Duration proximal to mother
	Duration looking at strange peer
	Duration looking at his mother
	Duration vocalization
	Duration of fretting or crying
3. Bayley Scale: Age appropriate items are administered. The specific items are listed in Table 2.	Child's behavior scored for passing or failing each item
4. Separation episode: Mother leaves child alone while child is playing.	Occurrence of fretting or crying
	Latency to the first fret or cry

Battery at 29 months

Session I.	Variables coded
1. Solo play: Child is in room with mother and set of age-appropriate toys for 21 minutes	(same as at 20 months)

2. Peer play: Same as at 20 months. An unfamiliar peer of the same age and sex and the peer's mother enter the room and a new set of toys was introduced. Behavior was observed for 28 minutes.	Same as at 20 months plus the addition of a variable called imitation of peer

Concept Familiarity Index

We modified slightly the Concept Familiarity Index developed by Francis Palmer of the State University of New York at Stony Brook to assess the child's understanding of 31 concepts. The child is seated opposite the tester at a small table and is asked to play a game. For example, the tester presents two small toy dogs and asks the child to "put the dog in the box." Two boxes are available, one is "bottom up," the other open and empty. The child's response is recorded by a coder in the observational room. The concepts are: in, big, littlest of 3, out of, little, biggest of 3, up, white, moving, not moving, black, down, on, under, around, in front of, behind, over, close, open, more, full, long, plate on cloth, hard, empty, soft, short, cloth on plate, top, bottom.

Separation Protest

As at each previous age, a brief two minute separation from the mother occurred. When the child was comfortably playing with toys in the center of the room, the mother rose, waved, said good-bye and left the room.

The child's latency to crying, his duration of crying, looking to the door, and latency to termination of the trial were recorded.

Session 2

Visit to unfamiliar day care center

Session 2 was held a minimum of seven days after Session 1. First the target child visited an unfamiliar day care center near William James Hall to determine his reactions to a group of completely unfamiliar peers in a novel situation. The mother, child, and examiner entered a room of about 10 to 15 children of approximately the same age who, along with their teacher, continued their activities. The examiner and mother were seated and coding began immediately, and lasted until 30 minutes of behavior were recorded. When the child appeared comfortable the mother encouraged him to join the other children. The mother was instructed to remain in her seat throughout the session although the coder, of course, followed the child.

Eight variables were coded on a prepared form in 10 second blocks for 3 ten minute epochs. Each 10 minute epoch was followed by a two minute rest period until 30 minutes of coding had been completed. The following behaviors were observed:

1. Proximity to mother;
2. Fretting;
3. The child's looking at another child or group of children;
4. The child's reciprocal play with another child involving contingent cooperative interaction;
5. The child's initiation of cooperative play to another child, and the child's initiation of an aggressive act directed toward another child.

6. The child remains when approached by another child;
7. The child withdraws when approached by another child;
8. The child plays with an object such as a toy rather than a person.

2. Embedded Figures Task

Upon returning to William James Hall the child was seated at a table opposite the examiner and presented the Embedded Figures Task. This task assessed the child's impulsive and reflective tendencies in a visual search situation. The test consisted of practice items in which the child was to find a picture that was identical with the model, where the foils were similar to the model in form. The child was shown a standard picture--a bird, for example, and asked to point to the bird in the illustration that was exactly like the bird on the standard card. The standard always remained present above the illustration. The child was trained to point unambiguously before he began. In the critical test items the standard to be located was embedded in a series of distracting lines. There were 9 critical test items, three for a cat, three for a car, and three for a flower. The examiner recorded the latency to the child's response from the moment search began and whether the child's response was correct or incorrect. If incorrect, the child was asked again to find the standard.

3. Memory for locations task

The child's short term memory capacity for locations was assessed following the embedded figures task. This task required the child to recall the location of a familiar object after it was hidden under one of five distinctive containers. For example, the

experimenter hid a toy shoe under a brightly colored pyramid shaped container. A barrier was placed in front of the containers for five seconds. The barrier was removed and the child asked to find the shoe. Number of containers and number of objects hidden were increased from one object under one container to a maximum of five containers and five objects. During the first five trials only one object was hidden under 1, 2, 3, 4, or 5 containers. These were used as training trials. In the four critical test trials, 2, 3, 4, or 5 objects were hidden under one of five containers. The child was asked to find one of the objects. If successful, he was also asked to find a second object.

RESULTS

We shall consider first the five tests of cognitive development--memory for locations, concept formation index, and embedded figures at 29 months, and the vocabulary and Bayley test items administered at 20 months.

Memory for locations at 29 months

The analyses are presented for two classes of comparisons. The first is for the closely matched pairs of children; the second involved the entire population tested at 29 months.

Matched pairs. The matched pairs performed similarly. On easy items where only two objects were hidden, most children (27 of 36) passed the item. On the difficult item in which five objects were hidden only four children were correct. On the two items of intermediate difficulty there was a slight but not significant tendency for more day care children to pass these items, but the difference was not reliable.

Larger sample. Table 3 shows the mean number correct on the four test items for the larger sample of 83 children. There was no difference among the children in the three types of care within each of the ethnic groups and, of course, no difference between day care and home control children when the ethnicity and social class subgroups were collapsed.

Table 4 contains the proportion of subjects in the day care (n = 21) and home control groups (n = 44) who passed each of the four items, separated by ethnic group.

Concept formation index at 29 months

Matched pairs. The matched pairs analysis revealed no difference between the day care or home control pairs (mean of 16.2 and 15.4). An item analysis revealed that on only four items did a significant day care-home control difference appear.

Larger sample. Table 5 contains the mean scores for the eight major subgroups. There was no simple effect of form of rearing but a strong class effect, with the middle class children attaining higher scores ($F = 7.65$, 1/61, $p < .01$). The effect of educational level of the family on the child's language development, which is a consistent result in many other studies, appeared once again.

The working class Chinese children in day care performed better than the working class Chinese children reared at home. But this difference was absent for the Caucasian or middle class Chinese children. This fact is reflected in the interaction of care by ethnicity ($F = 3.51$, 1/61, $p < .05$).

But among the Caucasian children, the home environment was more facilitating, for among both working and middle class Caucasian children the home reared children attained higher scores than those attending the day care center. Hence the facilitating effect of day care on language development was dependent on the child's home environment.

Embedded Figures test at 29 months

Matched pairs. The matched pairs analysis revealed no difference between the day care and home control groups on response time or accuracy to the nine critical test items.

Larger sample. All children showed longer response times to the most difficult items in each series and there was no significant day care-home control difference in latency or accuracy of performance. Day care children had a mean of 7.1 out of 9 correct for the critical items; home control subjects had a mean of 6.9. All children were competent at this task and there was no significant advantage associated with form of rearing, ethnicity or class.

Recognition vocabulary at 20 months

For the matched pairs, there was no difference between the day care and home control groups in the number of items correctly recognized. For the larger sample, Table 6 presents the mean score for day care versus home control groups within each ethnic and class subgroup: There was no effect of rearing within any of the class ethnicity subgroups and no interaction. But the Chinese children in both day care and home control groups had lower scores

than the Caucasians ($F = 4.96$, 1/71, $p < .01$).

We interpret the difference to reflect the differential exposure to and encouragement of language in Chinese and Caucasian homes in Boston. Informants have suggested to us that Chinese parents are less concerned than Caucasians with early language development.

The Bayley Scale items at 20 months

The Bayley items at 20 months were divided into two scales, a language scale of 15 items and a nonlanguage scale of 13 items--six of which involved imitation of the examiner and 7 of which involved putting forms in a form board (See Table 7).

The language scale failed to reveal any effect of care or any interaction with care for the matched pairs or the larger sample. But both social class and ethnicity influenced the language scores. The Caucasian children had higher language scores than the Chinese ($F = 7.92$, 1/70, $p < .01$), and children from middle class families had higher language scores than those from working class families ($F = 3.30$, 1/70, $p = .07$).

Performance on the nonlanguage items yielded one of the rare instances in which the day care experience had a clear and simple effect. For three of the four groups (Chinese working class and both Caucasian groups) the day care children obtained higher scores than the corresponding groups being reared at home ($F = 5.65$, 1/70, $p < .05$). For 11 of the 13 items on the nonlanguage scale the proportion passing was higher for day care than for home controls. This difference in performance on the nonlanguage items also held

for the matched pairs ($t = 2.51$, 28 df, $p < .05$).

Although unanticipated, the higher scores on the nonlanguage items for the day care children is not unreasonable. The day care teachers spend much time with the infants encouraging them to imitate acts that they have first demonstrated. Hence the day care child has considerable experience imitating adults in the center, perhaps more than a child living at home. Moreover, the day care child has many form boards in the center and therefore, the day care child has the potential for greater opportunity to practice the tasks that resemble those on the nonlanguage scale.

Attachment session at 20 months.

The attachment session, which was the first of the 20 months assessment episodes, occurred in a large room in William James Hall decorated as a living room. The actors were the child, the child's mother, an unfamiliar woman, and, for the day care children, the primary caretaker from the center, while for the home controls the familiar person was a female friend with whom the child had previous contact. The child was only given a few toys because we wished to promote mild boredom in order to see to whom the child went for comfort, if and when he became satiated with the toys. Additionally, in order to create mild apprehension, at two points in the session, at 15 and again at 30 minutes, each of the three adults suddenly changed their positions and took different seats. This event, apparently unprovoked from the child's point of view, alerted most children. We coded to whom the child oriented

after the change and whether he altered his proximity to any of the adults.

The main question asked was whether the day care experience altered the child's tendency to seek his mother when he was bored or mildly apprehensive.

Matched pairs. There was no significant difference between the day care and home control groups for any of the variables across the 45 minute session. For the critical variable of proximity to mother, the data did not reveal a difference between day care and home control children.

Larger sample. There were no differences associated with rearing for any of the variables except smiling. The home control children smiled a little more than the day care group ($F = 4.98$, $2/75$, $p < .01$). We have no easy interpretation of that difference.

The most important observation from this session was the overwhelming preference that all children showed for their mothers when they were bored or distressed. Table 8 shows the average duration (in seconds) the child was proximal to each of the three adults across the entire session. All children, day care and home control, as well as Chinese and Caucasian, selected their mother as the primary target. The ratio of time proximal to mother versus the familiar adult was about 7 to 1 and the day care children were as likely to choose their mother over the familiar adult as were the home controls. If approaching the mother when bored or uncertain is regarded as a moderately sensitive index of attachment of child to mother, it appears that the day care

children were no less strongly attached to their mothers than the home controls.

However, the Chinese children spent more time proximal to their mother than the Caucasians ($F = 6.48$, $1/75$, $p < .01$) and touched their mother more than the Caucasian children ($F = 6.56$, $1/75$, $p < .01$).

Behavior at time of adult movement. We coded each child's behavior for the 30 seconds prior to the adult's move and compared it with the child's behavior during the 30 seconds after the move. Since some children were proximal to their mother at the time of the movement a simple change score might have given a distorted picture of the effect of the intervention. We constructed a scale from 1 to 5 which reflected the child's tendency to approach the mother at the time of the adult movement. There was no difference between the day care and home reared children for average scale score across both rotations. However, the Chinese children showed higher average scale scores ($F = 7.95$, $1/83$, $p < .01$). At the time of the first movement, the Chinese children were more likely than the Caucasians to be near their mother during the 30 seconds prior to the rotation and to remain near her for the next half minute ($F = 11.1$, $1/69$, $p < .01$).

At the time of the second rotation, 15 minutes later, the middle class Chinese children had extinguished some of their apprehension. There was no overall ethnicity difference at the second movement, although the working class Chinese children were most likely to be near their mother at the time of rotation and to remain near her for the next half minute.

These data imply that home experience and temperament are more important determinants of apprehension than attendance at a day care center. In this context the day care experience did not appear to change the child's tendency to seek his mother as a target when he was distressed or bored. The day care child did not vacillate between choosing his mother or day care teacher, and chose the former with the same frequency as the home control child.

Separation protest 3 1/2 to 29 months

A second measure which many investigators regard as indicative of the child's attachment to his mother is the degree of protest the child displays to maternal departure. At the end of each assessment session from 3 1/2 through 29 months we evaluated the child's tendency to cry or fret following departure of his mother, leaving the child alone in a room where he had been happily playing. The procedure was identical at all sessions. When the child was happily playing, the mother said, "Good-bye," and left the room, and we noted the occurrence and duration of any protest, fretting and crying for a two minute period. Figure 1 shows the proportion of children who fretted or cried during the two minutes of departure. There was no difference between the day care and home reared children at any age. More important, there was a clear growth function for separation distress. The tendency to become upset was low for all children prior to 9 1/2 months, rase from 9 1/2 to 20 months, and then declined. This growth

function for distress to separation has been replicated on an independent sample of American infants (Kotelchuck, 1975), a sample of lower class infants living in Antigua, Guatemala (Lester, Kotelchuck, Spelke, Sellers & Klein, 1974), children being reared in children's homes on Israeli kibbutzim (Fox, unpublished), and Bushman children living in the Kalahari Desert (Konnor, unpublished).

These studies in different cultures all report an inverted-U function relating separation anxiety to age. This fact suggests that the occurrence of separation distress during the first 2 1/2 years of life is monitored closely by the child's level of cognitive development.

Play and social behavior

This section summarizes the data gathered on the solo and peer play sessions administered at 20 and 29 months of age. It will be recalled that at 20 and 29 months the children were observed in a pair of play sessions at William James Hall. Initially, the child played alone with his mother and an interesting set of toys. After a short recess an unfamiliar child and that child's mother were brought into the room along with a new set of toys and we observed the child in this new context. We were primarily interested in the change in the child's play and relationship to his mother from the solo to the peer sessions.

The twenty month session

Matched pairs. There were very few differences between the

day care and home control children during the solo play session at 20 months. The day care and home control children were equally at ease (or equally apprehensive) during the period when they were playing alone with their mothers in the room.

During the subsequent session with the unfamiliar peer and mother, the home control children played less than those in day care. Table 9 contains the 20 month values for play, proximity to mother, and looking at the unfamiliar peer for the solo and peer sessions for the first 15 minutes of the session and for the entire session. Both day care and home control children showed significant inhibition to the introduction of the peer, for both groups showed increased proximity to the mother and decreased play--both absolute amount of time playing as well as the average length of a typical play epoch. But the decrease in play was greater for the home control children. A comparison of the data from the peer play session revealed that the average amount of play per minute was larger for the day care than for the home control children ($t = 3.78$, $p < .01$).

Although most children were made uncertain by the introduction of the unfamiliar peer and mother, the home controls apparently were made more apprehensive by this event, even though both day care and home control children were with their mothers. The greater deterioration in play among the home controls implies that they were more uncertain with the unfamiliar peer. Most children during the second year of life display mild apprehension

to an unfamiliar child, due perhaps to the child's new ability to generate anticipations of possible actions of others but the temporary inability to resolve the questions inherent in those anticipations. Prior experience with unfamiliar peers--which was greater for the day care children--apparently buffers that uncertainty at this age. As we shall see this difference between day care and home control children disappears at 29 months. When the child has matured to a point where he is better able to resolve the uncertainty generated by the unfamiliar child, the difference between day care and home reared children vanishes.

Large sample. All the indexes of inhibition and apprehension increased following the introduction of the unfamiliar peer. The majority of the children stayed closer to their mother for a longer time ($F = 7.04$, 1/68, $p < .01$), vocalized less to the mother ($F = 15.68$, 1/68, $p < .01$), as well as displaying less undirected vocalizations ($F = 45.91$, 1/68, $p < .001$). The children also played less ($F = 52.09$, 1/68, $p < .001$) and had shorter average play epochs ($F = 32.41$, 1/52, $p < .001$) during the peer than during the solo session.

As with the matched pairs, the home control children showed a greater inhibition of play following the introduction of the unfamiliar peer, although both groups played less during the peer session (care by session $F = 6.26$, 1/68, $p < .05$ for average time playing). The day care children also looked less than the home controls at the unfamiliar peer ($F = 7.76$, 1/68, $p < .01$),

suggesting that the peer was less of a discrepant event to the day care child.

The Chinese children stayed closer to their mother during both solo and peer sessions, vocalized less during both sessions, and played less than the Caucasians.

The 29 month session

Matched pairs. As at 20 months, there was no difference between day care and home control children for any of the variables--play, vocalization, or proximity--during the solo session (see Table 10). Hence we assume the children were in an equivalent state prior to the introduction of the peer. Unlike the 20 month data, there were no significant differences in duration of play between home control and day care children during the peer session (see Table 10). Moreover, at 20 months the duration of an average play epoch decreased from solo to peer, but at 29 months these values increased from the solo to the peer session, suggesting that the unfamiliar peer was a less serious source of uncertainty and apprehension to the older child.

With maturity, the children seemed to become less apprehensive with the unfamiliar peer and the difference between the rearing groups disappeared. Psychological investigations which provide only one assessment at one point in time tempt investigators to assume that any difference noted at one age is likely to persist in the future or become amplified. These results demonstrate the danger of that inference.

The rate of cooperative, aggressive, or reciprocal play was very low and there were minimal differences between the rearing groups. There was no support for the notion that day care children are either more aggressive or more cooperative than children reared at home.

Larger sample. As in the matched pairs analysis, there were no differences between day care and home control children in time playing, amount of inhibition of play from solo to peer session, or proximity to mother.

Only two variables produced a simple effect for care. One was the percent of total time playing in which the child was involved in relational play. The day care children had a larger ratio ($F = 4.70$, 1/60, $p < .05$). The other variable was duration looking at the unfamiliar peer. As at 20 months, the home controls stared longer at the peer than the day care children ($F = 3.20$, 1/60, $p = .08$), and also stared at the peer more frequently ($F = 4.56$, 1/60, $p < .05$).

Chinese children remained more uncertain than Caucasians. The Chinese stayed closer to their mother ($F = 11.86$, 1/60, $p < .01$), vocalized less ($F = 9.77$, 1/60, $p < .01$), played less ($F = 4.89$, 1/60, $p < .05$), stared at the unfamiliar adult more ($F = 7.60$, 1/60, $p < .01$) and looked at the unfamiliar peer while proximal to their mother more often than Caucasians ($F = 3.98$, 1/60, $p < .05$).

Although the effects of day care on play -- both alone and with the unfamiliar peer -- were small they were less dramatic at 29 than at 20 months. A simplistic view of the relation between experience with other children and behavior with an unfamiliar child would have predicted a greater difference at the older age, since the day care children had nine additional months to interact with other children their own age. But if one views the inhibition at 20 months as a temporary phenomenon due to the child's inability to assimilate the discrepant experience of the unfamiliar peer, one would be more prepared to expect the data presented here.

Discrete social behaviors which included an interaction with the unfamiliar peer were infrequent at both 20 and 29 months, although a little more social behavior occurred at the older than at the younger age. We performed a frequency analysis on the data at both ages. Table 11 contains the proportion of children of each group showing any occurrence of the variables in question (1 or more occurrences). There is only slightly more social interaction at 29 than at 20 months, and at the older ages the home control and Caucasian children are more interactive. They initiate more cooperative as well as more aggressive responses and are involved in more social interactions. It is not valid to view the home control or Caucasian child as either more cooperative or more aggressive, but rather as simply more interactive. The day care Chinese children were the least interactive, while the home control Caucasians were the most. For the two variables

that required initiation by the child, more Caucasians -- both day care and home control -- displayed social overtures. Since the home control children are a little more social than the day care children at 29 months, it is clear that daily encounter with other children does not automatically lead the child to be socially more responsive with an unfamiliar child.

Visit to unfamiliar day care center

Matched pairs analysis. Table 12 contains the mean scores for proximity to mother, look at peer, and play with objects for the three successive 10 minute periods for 20 matched pairs of children. (Values are the number of 10 second epochs per minute that a given behavior occurred.) There were no rearing differences for proximity to mother or staring at peer. But the day care children played with objects longer than the home controls during the entire half hour episode ($t = 2.1$, $df = 19$, $p = .05$). Since play is a moderately sensitive index of the degree of uncertainty in an unfamiliar situation, the data imply that the day care children were a little less apprehensive than the home controls.

The larger sample. The day care children palyed more during each of the 10 minute periods (F for all 30 minutes = 4.48, 1/61, $p < .05$). Indeed, except for the Caucasian middle class boys, for every other ethnicity-sex-social class subgroup, the day care scores were higher than those of the home controls, suggesting that the day care children were less apprehensive in this setting. This is supported by the fact that the day care children

stared less at the unfamiliar children than did the home controls ($F = 6.45$, 1/61, $p < .01$).

As in the matched pairs analysis, there was the expected ethnicity difference for both play and proximity to mother with Chinese children playing less than the Caucasians ($F = 7.87$, 1/61, $p < .01$) and remaining close to their mothers for a longer period of time ($F = 7.15$, 1/61, $p < .01$). The home control Chinese had the lowest play scores of all four groups (1.9 for the home control Chinese versus 3.5, 3.7, and 3.2 for the other three groups). As with the cognitive measures, the day care experience seemed to alleviate the apprehension and inhibition characteristic of the home reared Chinese.

Only 40 of the 69 children made any social overture toward another child. Table 13 contains the distribution of children who did or did not make any social initiation by care and ethnicity. There was no effect of rearing on this variable.

The effect of the day care experience, although not extreme, was in the expected direction. One would anticipate the day care children to be a little less apprehensive in this unfamiliar group care setting than children reared at home. The lack of any difference between the two groups on proximity to mother, together with the parallel increases in play and decreases in proximity to mother across the half hour, imply that both groups were equally apprehensive initially and extinguished that initial apprehension at a similar rate. Once again, the similarities between the day care and home control children are as, or more, salient than the differences.

Discussion

The central question that provoked the investigation can be answered with some assurance. Attendance at a day care center staffed by conscientious and nurturant adults during the first 2 1/2 years does not seem to sculpt a psychological profile very much different from the one created by total home rearing. This conclusion is based not only on our formal assessments but also on our informal observations of the children over the 2 1/2 year period. These data did not confirm several popular notions about early group care. Although it is reasonable to assume that daily encounter with other children during the first two years might speed up the maturation of the social interaction sequences usually seen in 3 and 4 year olds, our data did not provide dramatic support for that prediction. The 20 and 29 month olds were simply not very social and did not often initiate play with other children. Both cooperative and aggressive play occurred infrequently among both groups. There were as many shy children among the day care group as there were among the home controls. Indeed, on one occasion we satisfied our curiosity about a particular girl who was inordinately shy with a strange peer in our 20 month assessment by bringing an unfamiliar peer to the day care center. The girl retreated at once to her day care teacher, even though she was in her territory. The day care children were neither more cooperative nor more aggressive than home controls.

Some have argued that day care experience promotes an insecurity in children which makes them more prone to seek their

mother when frightened or bored. All the children were disposed to approach their mother when they became uncertain in the presence of the unfamiliar peer or as a result of the unprovoked movements of the adults during the 20 month attachment session. The separation anxiety situation revealed a remarkably similar growth function for both day care and home controls, verifying data from other studies.

Some investigators have suggested that multiple caretaking by adults other than the mother weakens or dilutes the child's emotional bond to his mother. The day care child had two primary caretakers in addition to the mother -- one caretaker from 3 1/2 to 13 months and a second caretaker from 13 to 29 months. In addition all were exposed to other adults who administered occasional care at the center. Nonetheless, day care and home control children were equally likely to choose the mother as the target for solace and attentive nurturance when they were bored, tired, or afraid. The day care child was no more likely to approach his or her primary caretaker from the center than was the home control child to approach a friend of the family during the 20 month attachment session.

The entire corpus of data supports the view that day care, when responsibly and conscientiously implemented, does not seem to have hidden psychological dangers. Since this conclusion flies in the face of much popular belief -- including a prior prejudice of one of the principal investigators -- it is both useful and natural to maintain a skeptical attitude toward this generalization.

One objection is to question the sensitivity of our methods of assessment. It is always a possibility that a scientist's methods are insufficiently valid indexes of his constructs. The history of psychology is littered with type II errors. Many investigators who found no class differences on the Bayley Scale under one year concluded that class had no effect on cognitive development during the first year of life. But when different methods were employed -- for example, fixation time to discrepant events or vocalization to samples of speech -- clear class differences emerged. The Bayley was not sensitive enough to detect them. It is, of course, impossible to assert that the day care and home control children are not psychologically different. It is the responsibility of the investigators who believe that early group care makes a difference to invest more sensitive methods to demonstrate the validity of that hypothesis. We will be among the first to accept that finding if the data so indicate.

But let us suppose that our methods are relatively sensitive and, indeed, there are trivial and nonenduring differences in cognitive, social, and affective development between our two main groups. How is that possible, considering the fact that the day care children spent as much time in the center as they did at home. An initial attempt at interpretation assumes that the psychological experiences at home have a priority -- they are more salient and more affectively charged than the experiences at the center. Let us consider some speculative arguments that might account for the differential salience of caretaking experience at home versus

the center. If we assume that the biological mother has been the primary caretaker at home for most of the children -- our informal observations are in accord with that assumption -- the question reduces to: Why does the mother's psychological impact on her child seem to be greater than that of the female caretaker in the day care environment?

Part of the answer to that question may lie with the greater unpredictability of the mother which leads her to become a more salient object in the infant's world.

A conscientious and nurturant caretaker in a group setting is keenly aware of the psychological diversity among the children in the setting as well as the differences in the values between each parent and herself. As a result, she is unlikely to hold rigid standards of behavior for each child regarding talkativeness, cooperativeness, cleanliness, aggression, quality of play, or the age when particular developmental milestones should appear. She is likely to be more relaxed about these standards than the parents because she is less profoundly identified with the children in her care. It is neither a source of deep pleasure if one of her children is slightly precocious in learning to drink from a cup nor a source of anxiety if a motorically retarded child spills his milk every day. This tolerant attitude toward diversity in growth patterns leads the caretaker to give each child considerable license to behave in accord with his temperamental disposition and relative level of maturity. As a result, with the exception of extremely destructive or regressed children, the

caretaker does not impose constraints on the children when they seem occupied and happy. As a result the average child does not generate serious uncertainties about the caretaker's actions when he is exploring his environment.

By contrast, the typical mother is identified and emotionally involved with her young child. She has a set of discrete standards for his behavior and she vigilantly watches for deviations from those standards. One mother may believe that any defiance of her requests is a sign of future rebelliousness and she quickly and firmly reacts to it with disapproval or punishment. Most mothers hold standards for cleanliness, potentially dangerous acts, aggression, talkativeness, time of walking, talking, and other developmental milestones. The mother diagnoses deviations between her child's developing profile and her idealized standards, and when those deviations are too large she intrudes into the child's life space and attempts to shape his behavior so that it is in closer conformity with her understanding of the appropriate growth curve. Each intrusion -- be it punishment, praise, or command -- punctuates the child's ongoing behavior and consciousness and creates a temporary node of uncertainty which alerts the child to the mother and to the action just issued. This speculative line of argument implies that the typical mother in our sample was a more distinctive source of uncertainty for the child than the surrogate caretakers in the center. The mother was less predictable than the caretaker; she was more difficult to understand. In the language of classic psycho-analytic theory,

the mother was more highly cathected than the caretaker. In the more modern language of information processing theory, the mother was a more salient event. In a special sense, a parent's behavior poses a more difficult discrimination problem for the child than that of the caretaker. As a result, the parent is a more affectively charged object. Of course, if a caretaker behaved like our caricature of a mother (that is, she held fixed standards for the behavior of the child and intruded when the child deviated) the caretaker would also become highly salient and affectively charged. But in a typical day care center -- and certainly in our center -- most caretakers did not behave in this manner.

It is interesting to note that a recent study of kibbutz-reared children, who spent over 20 hours of each day in an infant house with a metapelet, also revealed the salience of the mother over surrogate mother. The 12 to 15 month old children were more likely to approach their mother than their metapelet when a female stranger was in the room with both caretakers, and were less apprehensive when they were with their mother and a stranger than when they were with the metapelet and the same stranger. It is unlikely that the amount of time a child spends with a caretaker is a critical variable. Rather, the nature of the psychological interaction is essential.

We do not know if these speculations have any validity. But these data, as well as those of studies reviewed earlier, suggest that children from intact and psychologically supporting families

who experience surrogate care during infancy and early childhood. resemble home reared children from their own social and ethnic group to a greater degree than they do children of other ethnic and class backgrounds who are in the same extra-familial environment. The effects of the home appear to have a salience that is not easily altered by the group care context. The family has a mysterious power, which is perhaps one reason why it has been the basic and most stable social unit in this and other societies for so long a time.

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Table 1

Distribution of children in each of the groups by care, sex, ethnicity and social class

	Day care		Home control		Mixed	
	B	G	B	G	B	G
Chinese						
Working class	4	5	9	6	0	0
Middle class	3	4	6	9	5	2
Caucasian						
Working class	5	2	5	14	1	0
Middle class	5	5	6	12	5	3

Table 2

Bayley items administered at 20 months

Language Scale

Item	
126	Child shows comprehension of verbal request to put doll in chair
	Gives doll a drink on request
	Wipes doll's nose on request
128	Child identifies three parts of doll
127	Child uses words to make wants known
36	Child says sentence of two words
130	Child names 1 picture to request
132	Child names or points to 3 pictures on request
139	Child names or points to 5 pictures on request
141	Child names 3 pictures
148	Child names or points to 7 pictures
149	Child names 5 pictures
124	Child names 1 object
138	Child names 2 objects
146	Child names 3 objects

Nonlanguage Scale

119	Child builds tower of 3 cubes in imitation
143	Child builds tower of 6 cubes in imitation
129	Child places 2 round and 2 square blocks correctly in form board
142	Child places any 6 blocks correctly in blue form board
155	Child completes blue form board in 150 seconds
125	Child shows definite stroke in any direction in imitation of examin

Table 2 (cont.)

147	Child differentiates direction of strokes in imitation
135	Child changes from straight line to scribble in imitation
157	Child attempts to fold in imitation of examiner
120	Child places round block in pink form board
137	Child places all 3 blocks in pink form board
151	Child places all 3 blocks w/ board reversed
154	Child makes exact copy or puts 3 cubes in row and pushes them in imitation of examiner's model of a train

Table 3

Mean number items correct on memory for locations task (maximal = 4)

	Chinese	Caucasian
Day care	1.6	2.3
Home control	1.6	2.0
Mixed	1.9	2.0

Table 4

Percent of children in each subgroup passing each of the test items for day care and home control children (N = 65)

Group	Two objects hidden	Three objects hidden	Four objects hidden	Five objects hidden
Chinese day care	57	36	50	14
Caucasian day care	100	29	43	29
Chinese home control	70	35	35	15
Caucasian home control	83	29	42	46

Table 5

Average number correct on the Concept Formation Index

	Day care	Home control
Chinese working class	13.4	10.7
Chinese middle class	17.5	18.0
Caucasian working class	15.0	18.3
Caucasian middle class	19.4	22.0

Significant effects Class $F = 7.65$ $1/61$, $p < .01$

Care by ethnicity $F = 3.51$, $1/61$, $p < .05$

Table 6

Mean number correct on vocabulary recognition test at 20 months

	Chinese		Caucasian	
	Working class	Middle class	Working class	Middle class
Day care	5.6	6.7	9.0	7.3
Home control	4.7	6.7	7.7	7.9

Table 7

Average score on the Bayley items

at 20 months

Language items

	Day care		Home control	
	Middle class	Working class	Middle class	Working class
Chinese	8.0	6.1	9.0	5.0
Caucasian	10.0	9.0	9.4	9.8

Significant effects: Ethnicity $F = 7.92$, 1/70, $p < .01$

Class $F = 3.30$, 1/70, $p < .07$

Nonlanguage items

	Day care		Home control	
	Middle class	Working class	Middle class	Working class
Chinese	8.6	6.7	8.6	5.3
Caucasian	8.1	7.6	6.6	5.4

Significant effects: Care $F = 5.65$, 1/70, $p < .05$

Class $F = 10.58$, 1/70, $p < .01$

Matched pairs

	Day care	Home control
Language	8.3	7.8
Nonlanguage	7.8	6.4

Table 8

Proximity to mother, familiar adult, and stranger adult for attachment session (mean value in seconds)

	Chinese			Caucasian		
	DC	HC	Mixed	DC	HC	Mixed
Mother	117	85	80	62	59	55
Familiar adult	4	17	6	11	19	9
Stranger	0.4	0.6	1.4	0.7	2.0	1.6

Table 9

Play behavior at 20 months for matched pairs (n = 29 pairs) (mean values)

	Day care		Home control	
	Solo play	Peer play	Solo play	Peer play
Proximity to mother (seconds per minute)				
Mins. 1 to 15	12.3	16.9	10.3	23.7
Entire session	14.1	16.7	11.9	23.3
Average time playing (seconds per minute)				
Mins. 1 to 15	45.6	33.9	48.5	21.9
Entire session	44.1	34.6	45.8	22.4
Duration look at peer (seconds per minute)				
Mins. 1 to 15	--	15.0	--	22.0
Entire session	--	13.9	--	21.1
Looking at peer while proximal to mother (seconds per minute)				
Mins. 1 to 15	--	7.0	--	12.8
Entire session	--	6.3	--	12.0

Table 10

Play behavior at 29 months for matched pairs (n = 20 pairs) (mean values)

	Day care		Home control	
	Solo play	Peer play	Solo play	Peer play
Proximity to mother (seconds per minute)				
Mins. 1 to 15	11.8	22.9	6.1	24.3
Entire session	12.0	21.6	7.0	24.7
Average amount of play (seconds per minute)				
Mins. 1 to 15	48.2	38.2	51.0	32.0
Entire session	47.5	37.4	50.6	31.3
Duration look at peer (seconds per minute)				
Mins. 1 to 15	--	11.2	--	15.5
Entire session	--	11.4	--	14.6
Duration proximity to mother while looking at peer (seconds per minute)				
Mins. 1 to 15	--	6.3	--	9.1
Entire session	--	5.3	--	8.3

Table 11

Proportion of the group displaying the variable in question ($\geq$ 1)

	Initiate Cooperatively	Initiate Aggressively	Stays	Resists	Withdraws
Day Care Chinese					
20 months	50	56	75	38	44
29 months	46	46	77	30	30
Home Control Chinese					
20 months	50	44	78	61	39
29 months	57	33	77	24	28
Day Care Caucasian					
20 months	71	71	64	43	50
29 months	77	55	55	22	22
Home Control Caucasian					
20 months	68	54	71	46	39
29 months	84	80	84	52	48

Proportion of children displaying reciprocal play or imitative behavior at 29 months

	Reciprocal play	Imitates peer
Day Care Chinese	0	23
Home Control Chinese	24	48
Day Care Caucasian	22	55
Home Control Caucasian	56	64

Table 12

Behavior in unfamiliar day care center for matched pairs at 29 months*

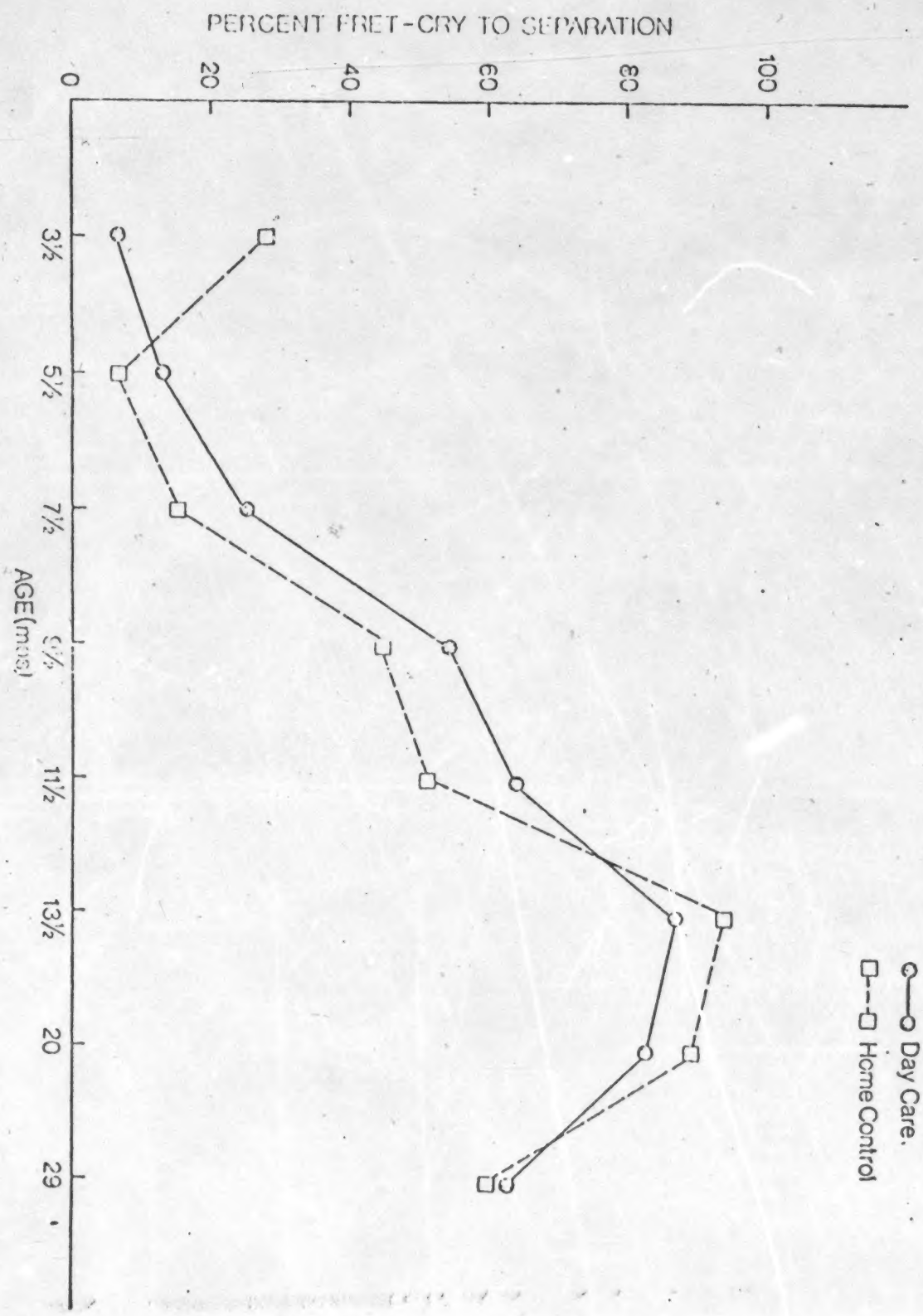
	Day Care	Home control	Difference
Proximity to mother			
Minutes 1-10	3.6	3.1	
11-20	2.7	3.1	
21-30	2.6	2.6	
Look at other child			
Minutes 1-10	3.4	4.0	
11-20	2.7	3.0	
21-30	2.2	2.7	
Play with objects			
Minutes 1-10	2.6	1.7	
11-20	3.9	2.3	t=2.59,df=19,p < .0
21-30	4.0	2.8	

*Values are rate measures: mean number of 10 second epochs per minute during which a given behavior occurred

Table 13

Number of children initiating play with another child

	Day Care		Home Control	
	Chinese	Caucasian	Chinese	Caucasian
No initiations	8	3	12	6
One or more initiations	6	5	9	20


PERCENT FRET-CRY TO SEPARATION
0
20
40
60
80
100
3½
5½
7½
9½
11½
13½
20
29
AGE (mos.)
Day Care
Home Control